Hudson (E. D.) 16

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ARTIFICIAL LIMBS

FOR THE UNITED STATES ARMY AND NAVY.

PER COMMISSION OF SURGEON-GENERAL, U. S. A.

"At the outset of the war," says the *American Medical Times*, August 2, 1862, "we proposed that an appropriation should be made by Government, of money, for the purchase of Artificial Limbs for soldiers who have lost their arms and legs in the service. This proposition was entertained in Congressional circles, and an appropriation made at the last session of Congress." The matter was referred to the Surgeon-General, United States Army, who gave notice that a Board of Physicians and Surgeons would be convened in New York, for the purpose of investigating the comparative merits of Artificial Limbs. This Board, consisting of Dr. Valentine Mott, *President;* Dr. Satterlee, Medical Purveyor, United States Army; Dr. Bache, United States Navy; Dr. William H. Van Buren, of New York; Drs. Gross of Philadelphia, and Warren of Boston, after a preliminary meeting, assembled for the purpose of examining models of different limbs, on the 27th of August, 1862. The object of this Board was to examine the merits of different limbs, and report to the Surgeon-General. They accordingly, after a thorough examination, selected five persons, and recommended that each be commissioned to construct all limbs for soldiers in one of the following cities, to wit: New York, Philadelphia, Baltimore, Cincinnati, and St. Louis.

On October 24th, C. McDougall, Surgeon, United States Army, Medical Director, notified Dr. E. D. Hudson that he had been instructed by Surgeon-General Hammond, United States Army, to place all soldiers needing artificial legs under his charge for treatment; and further, that all mutilated soldiers at that time in his department, as well as all thereafter brought to the port of New York, and vicinity, were to be transferred to the "Central Park Hospital," which is devoted specially to

such cases. Dr. Hudson holds a commission for the treatment with artificial limbs, of all who have suffered amputation of the inferior extremities, who have been transferred to the department of Surgeon C. McDougall, United States "Medical Director, Department of the East," and the United States General Hospitals of that department.

NEW RÉGIME.

In August, 1864, Surgeon-General Joseph K. Barnes, United States Army (successor of Surgeon-General Hammond), ordered a *new Board* of Surgeons to be convened to reinvestigate the *comparative merits* of all the various artificial limbs which are constructed for the mutilated, which might be offered for their investigation, and to elect those most meritorious for the United States Army and Navy. The new Board was composed of Surgeon R. S. Satterlee, Medical Purveyor, United States Army, *President;* Surgeon Charles McDougall, United States Army, "Medical Director, Department of the East;" and Surgeon A. B. Clement, United States Army, in charge "Central Park United States General Hospital," *Registrar.*

After a protracted, laborious, and critical examination of the numerous appliances which were presented, the Board *reported*, and the Surgeon-General *approved*, a *reaffirmance* of the *commission* to those who were recommended and commissioned by the first Board and Surgeon-General Hammond.

Under the *new régime*, each mutilated soldier and marine of the United States Army and Navy is permitted to *elect* for himself, from among those who are commissioned, the one he may prefer to furnish and apply to him an artificial limb. Any mutilated soldier, by applying to the Surgeon in charge of the United States General Hospital at which he is a patient, and to the Medical Director of any department, will be furnished with all necessary means to procure *an artificial leg* of the *best quality*, prepared by the commission he may elect.

THIRD BOARD AND APPOINTMENTS.

ARTIFICIAL LIMBS—APPARATUS FOR RESECTION.

By order of Surgeon-General Barnes, a third Board, consisting of Dr. J. Simmons, U. S. A.; Dr. Hewitt, U. S. A.;

and Dr. Clements, U. S. A., convened at New York in March, 1865, to examine various artificial legs and arms and investigate the practicability of Dr. Hudson's apparatus for Resection, several of which had been previously furnished, by special order of the Surgeon-General. Cases of Syme's operation, disarticulation at the knee joint, and other difficult cases, successfully treated, were presented by Dr. Hudson. These received weighty attention, and modified the opinions which the members of the Board had held respecting the use of the articular surfaces of the knee and ankle, as bases of support. The improved knee-bearing limb and apparatus for Syme's operation, originated by Dr. Hudson, received especial commendation.

The possibility of compensating the powers and functions of the arm, impaired by resection, had not been entertained by the board. A supporting splint was all they expected. The apparatus presented—its artistic beauty, the scientific and anatomic principles observed in its construction and adaptation, the physiological functions which it supplies either in whole or part, and its great practical success—secured for it an extended consideration. It received the highest personal encomiums of the members of the Board and was deemed of such importance as to merit a separate commission. This commission applies to all cases of resection—of the humerus and ulna and radius—as well as of the joints.

Dr. Hudson was the first to propose to the profession the treatment of resections of the elbow and shoulder with compensative apparatus. Many cases in military and civil practice have been successfully treated during the past two years. To supply lost leverage, to give rigidity to the muscles, to restore the functions of flexion, extension, pronation and supination —impaired by wounds of the muscles or motor nerves—and leave the arm in a condition favorable to the reproduction of bone, and possible reunion, are the objects sought and obtained by this apparatus. It is destined to work a great change in the operative surgery of the superior extremity. With its introduction, the only objection to resection—uselessness of the mutilated arm—is obviated, and this operation will be extensively substituted for amputation.

SURGEON-GENERAL'S OFFICE,
Washington City, D. C.,
May 13, 1865.

Dr. E. D. HUDSON, New York City.

Sir: In accordance with the recommendation of a Board of Medical Officers, recently convened in the city of New York, you are authorized to furnish to mutilated soldiers, upon the order of the Medical Director of a Department, *Artificial Legs*, of the approved pattern presented by you to the Board.

By Order of the Surgeon-General.

Very respectfully your obd't servant,

W. C. SPENCER,
Ass't Surg. U. S. Army.

N. B.—This is the third commission granted by the U. S. to Dr. Hudson, *who has furnished artificial legs to the Government during the war.*

SURGEON-GENERAL'S OFFICE,
Washington City, D. C.,
May 13, 1865.

Dr. E. D. HUDSON, New York City.

Sir: In accordance with the recommendation of a Board of Medical Officers, recently convened in the city of New York, you are authorized to furnish to mutilated soldiers, upon the order of the Medical Director of a Department, *Artificial Feet*, of the approved pattern presented by you to the Board.

By Order of the Surgeon-General.

Very respectfully your obed't servant,

W. C. SPENCER,
Ass't Surg. U. S. Army.

N. B.—Dr. Hudson is the only one commissioned to apply Artificial Feet in cases of Syme's Operation at the Ankle Joint.

SURGEON-GENERAL'S OFFICE,
Washington City, D. C.,
May 13, 1865.

Dr. E. D. HUDSON, New York City.

Sir: In accordance with the recommendation of a Board of Medical Officers recently convened in the city of New York, you are authorized to furnish to mutilated soldiers, upon the order of the Medical Director of a Department, *Apparatus for Resection of Elbow and Shoulder Joints*, of the approved pattern presented by you to the Board.

By Order of the Surgeon-General.

Very respectfully your obed't servant,

W. C. SPENCER,
Ass't Surg. U. S. Army.

Surgical Science and Specialty.

TO THE PROFESSION AND PUBLIC.

EXPERTUS LOQUOR.

In the year 1848, a comminuted fracture, requiring amputation of the leg, occurred in my own home circle. In seeking an artificial substitute which should, to some degree, repair the loss, I realized how little had been accomplished in surgical art. I perceived the necessity of bringing this branch, hitherto abandoned to the mechanic, within the pale of medical and surgical science.

My attention was attracted to Mechanical Surgery as being no less important than operative art, since to merely amputate a limb with the most favorable success, is only to half finish the work of surgery. I began to investigate the manipulating art, its status, the merits and demerits of representative legs and arms, of appliance for distortions resulting from diseased hip, knee, and ankle joints, and to what extent "Art had become the handmaid of Nature." I became inspired for the good of others—for the more perfect requital of their mutilations—purchased a large interest in the invention of Mr. Palmer,* with whom I associated my name and profession.† I

* That interest, now superseded by improvements which I have made, I STILL POSSESS RIGHTFULLY.—E. D. H.

† All were used fourteen years entirely for the *good-will* of PALMER & CO. —E. D. H.

called to my aid men of great moral and intellectual worth, well versed in the mechanic arts; and have studiously, with untiring assiduity, devoted a good share of my professional services during the last seventeen years to this specialty of surgery. I assumed the entire charge of the numerous and variform cases of mutilated and deformed limbs, which were presented for treatment, at Springfield and New York, alternately, in constructing, modifying, adapting, and applying artificial legs, arms, hands, and also various apparatus for congenital malformations and defects. I have counseled and assisted in the performance and after-treatment of eight AMPUTATIONS OF CONVENIENCE of the inferior extremities, for their irremediable malformations, diseased and deformed conditions, invariably with the most gratifying success. The treatment which I have given to stumps, rendered unfavorable by extensive sloughings and exfoliations, and the adaptation of appliances thereto; to abscesses and ulcers of stumps from constitutional and local causes, to diseased and morbidly sensitive nerves and neuralgic affections, to excess of adipose tissue, to stumps with unfavorable tendencies when amputation had been occasioned by fungus tumors, to stumps flexed in various angles by a contraction of the muscles—I am gratified to know has been highly appreciated, by both my professional friends and patients, for its general happy results. I am also pleased to know that the interest I have felt in every advance in modern surgery, specially relating to amputations of the foot and ankle, and their after-treatment, by improved appliances, receives the cordial approbation of the profession.

MECHANICAL SURGERY AS A SPECIALTY.

Of late years the importance of bringing the treatment with apparatus of mutilations and deformities, under the immediate supervision and control of professional men, has merited and received increased recognition. The application of trusses, the application of apparatus for spinal and hip diseases are but a few of the many callings which the past ten years has seen

transferred from the mechanic to the physician and surgeon. The prescribing, constructing, and applying of artificial limbs, without knowledge of the anatomy of the member, of the form of limb most advantageous in various operations and the modifications necessary with regard to health, condition of parts, and individual habits, are too great a piece of charlatanism to be countenanced.

The great advances in Military and general Operative Surgery, the many new and modified operations resultant from the experience of the late war, and the demand upon Mechanical Surgery to meet with appropriate reparative apparatus the multiform mutilations and deformities, render the duties of its practitioner onerous yet honorable. The great variety of cases of resection, amputation, disarticulation, anchylosis, ununited fracture, &c., each peculiar in its individual requirements, calls for continuous study and the continued exercise of professional knowledge and scientific experience.

Of resection is this especially true. Of many cases treated thus far, no two have been exactly alike either as to mode of operation or the nature and degree of functional disability. Hence the necessity of ascertaining in each case, by careful examination and experiment, the exact condition in which the parts are left—what nerves or muscles have been severed or injured, what actions lost or impaired, the length of bones removed, what muscular contraction has taken place or may be expected, and the possibility of any future reproduction of the bone. By the contemporaneous treatment of a greater number and variety of special cases than would come within years of the most extensive surgical practice, the opportunity is presented of making direct observation of the comparative safety and success of different operations, and those most favorable to the restoration of lost powers both by nature and by art.

The collection and classification of data, while necessary in each individual case for its proper treatment, is of still greater value to the profession, and constitutes a powerful argument in favor of their lending their patronage and influence to the physician or surgeon who earnestly and faithfully devotes himself to this specialty.

I.—ARTIFICIAL LEGS.

REPRESENTATIVE LEGS

should imitate as closely as possible the natural, in form, color, the mechanism and motions of the joints, and essential motor parts, for self-moving or standing with elasticity and reliability; they should also possess the greatest durability compatible with lightness, to enable them to serve constantly by swinging to and fro thousands of times each day, and to sustain heavy burdens, extensive strains, and hardships with the utmost impunity.

ARTIFICIAL LIMBS.

THE ARTIFICIAL LIMB which Dr. Hudson furnishes and applies for civilians, United States officers, soldiers, and marines, always with a faithful regard to the pathological condition of the mutilated limb, personates all of the essential anatomical formations and physiological functions of the natural leg, in general configuration, formations of knee, ankle, and toe joints; of muscles and tendons of the foot, leg, and thigh for flexion and extension, for walking, standing, sitting, horseback-riding; for elasticity, naturalness of dress and action, and gratifying comfort and usefulness.

EXPERIENCE.

Dr. Hudson's experience in the application of artificial limbs, extends through seventeen years, first as executive member of the firm of Palmer & Co., at the time when the "Palmer Leg" gained its greatest *éclat*, and during the period of its greatest demand, and subsequently in the construction of limbs, combining the principles and merits of the Anglesey and Palmer limbs with recent and original additions and improvements.

Without applying for patents or seeking the monopoly of any excellence, he has endeavored to combine all that is truly desirable and useful in limbs.

Adjustable sockets, lateral motion, metallic, rubber, and leather limbs, and many others now presented to the public as original and advantageous, have been tested and discarded.

Most of the above are reproductions of the models of French and German makers.

ADVANTAGES AND IMPROVEMENTS.

Its advantages are lightness, elasticity, durability, reliability, and artistic shape and finish of the highest quality, *wrought by men of years' experience.*

Its improved TIBIO-ASTRAGALOID ANKLE-JOINT similates the human ankle joint in form and function, and is not subject to corrosion, stiffness, or noise.

Its CONDYLOID KNEE-JOINT is likewise a *new* and indispensable adjunct to a first-class limb, particularly for the treatment of all cases of mutilated inferior extremities, which require a *knee-supporting* artificial leg, *with thigh and leg parts of the same length as their fellows.*

See following description and cuts:

AMPUTATIONS OF THE INFERIOR EXTREMITIES.

RADICAL PRINCIPLES.

"You shall cut off as little of that which is sound as you possibly can; and so that the patient may most fitly use the rest of his leg, by walking on an artificial leg."—*Parè.*

Notwithstanding the above axiom was enjoined three hundred years ago, it is not unfrequent, even now, that the principle relating to danger, and that like unto it, the subsequent usefulness of the patient with "the rest of his leg," and the most useful artificial leg, are inexcusably and culpably violated, particularly so on the persons of the poor!

It is also no less an important fact to be considered that those who are poor now may soon become rich, and *vice versa.*

A Case.—An enterprising lady, residing in this vicinity, now well to do by the avails of her own efforts, suffered an amputation of her leg at its upper third, when she was both young and poor, and regarded a proper candidate for a "peg leg;" while the sound parts admitted of the amputation at the lower third, with which she might now use an appliance that would render her loss comparatively trifling. The favor with which the moral sense of her surgeon is regarded will be seen intuitively. This case is no exceptional one.

SOCIAL AND ECONOMIC CONSIDERATIONS.

Laboring men and women comprise a very large majority of those who suffer amputation of the inferior extremities, most of whom obtain artificial legs to compensate their loss, and thus are enabled to pursue their usual vocations, and subsist therefrom. Of this proportion nearly one-half obtain limbs by the gratuities of the sympathizing and considerate of the community, who entertain the abstract principle that their own moral and financial interests are involved in the interests and greatest usefulness of their suffering neighbors. *They judge rightly.*

In every such instance they are the benefactors of mankind who contribute to the greatest usefulness and happiness of the mutilated; and who, by their moral efforts, both *conserve* and *restore.* Such, in brief, are the considerations which every surgeon should magnify while determining an amputation.

MODES OF AMPUTATION AND THEIR RESULTS.

More diverse views and practice nowhere exist than with the members of the profession respecting the modes of amputating to secure the most useful stumps. I have formerly expressed opinions somewhat at variance with my present judgment. The great number and variety of modes of amputation, and their results, in the United States military service and in civil practice, which have been presented to my observation for final treatment during the late civil war, indicate an undeter-

mined *general rule* as to the modes of operating to secure primary healing and the best formed and conditioned stumps.

From my note-book, and history of nearly one thousand recent cases of amputated inferior extremities which I have carefully collected, my summary is as follows, to wit:

The greatest number of model stumps—in regularity of form, smoothness of cicatrization, primary healing, and general features and condition—were constructed by the circular operation. The next greatest number of beautifully composed model stumps were of the bilateral integumentary flaps, with circular incision of the muscles, and with the tibia sawed at an angle slightly varying from a right angle. I do not recollect an instance, where the crest has been beveled, which has not resulted in defacement of the stump, and very generally in necrosis and chronic ulcers. I notice a much less number of bilateral flap operations than circular, hence a less number of well composed stumps of that mode.

A long, anterior, rectangular flap, for thigh amputations, results gratifyingly when no retraction occurs.

I have seldom seen a well-formed stump, of the leg, made by a posterior flap. Generally they are redundant, pendulous, retracted, leaving the anterior part of the tibia exposed, resulting in an unsightly cicatrix, often presenting unfavorable angles, and subject to congestion.

The anterior-posterior, or double flap operations, sustain a preëminence in frequency, but are of secondary merit for symmetry and utility.

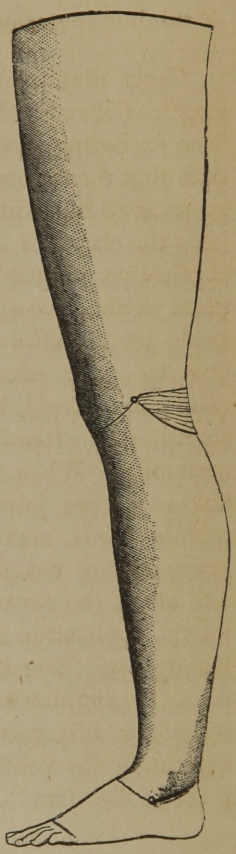
To classify the different varieties of amputations according to their special merits I note as follows:

1. Bilateral integumentary flaps with circular incision of the muscles.
2. Circular.
3. Anterior-posterior.
4. Anterior rectangular.
5. Posterior.

Great disadvantages accrue to the patient from extreme length of stump—disadvantages little less than those resulting from exceeding shortness. A rule no more definite and precise than that for modes of amputation seems to have governed surgeons as to the best length of stump to preserve, when they have the choice of site, for the benefit of the subject and the application and use of artificial legs. When the condition of parts would have allowed of amputation through the knee or ankle joints—always the first places of election for the thigh and leg—they often choose the extreme lower third. This results in a torpid, livid, cold and unfavorable condition of the stump, and often—especially of the leg—in necrosis of its extremity. When amputation must be performed above the ankle or knee joints, to elect the junction of the lower and middle thirds, making the stumps nine inches long from the lower edge of the patella and the same from the tuber ischii, will afford the most advantageous length, for either leg or thigh, for the application of a symmetrical artificial leg and its satisfactory use. The cases of chronic ulcers and necrosis of the tibia, in amputations just above the malleoli, necessitating secondary amputation, have been very numerous, and should determine the profession upon a more definite and beneficial place of election.

involve to a greater or less degree, the usefulness of the patient with an artificial leg, or his entire helplessness without such an appliance; depending upon the ravages of disease, extent of injury, and the nice discrimination, enterprise, and moral sense of the surgeon, and his corresponding efforts to save every possible iota of bone and muscle for leverage and power, the flexion of the thigh upon the body, propulsion of the artificial leg, and entire command of it in every position. The very great disparity in ease and gracefulness, as well as the utility to patients, of thigh-adjusted artificial legs, in walking, standing, and labor,

is mainly attributable to the defective power and leverage of the stump; consequently the great and wise maxim of Parè should rule rigidly in every thigh amputation.



Leg for Thigh Stump.

DISARTICULATION OF THE KNEE-JOINT.

Amputations at the knee-joint are greatly preferable to those of the thigh in the facilities afforded for the practical application of apparatus, and its subsequent use with comfort, ability, and naturalness. With credit to conservative surgery, many eminent surgeons have revived, with modifications and improvements, the ancient operation of disarticulation of the knee-joint. They have attained a success which fully demonstrates its safety, while subsequent treatment, with improved and appropriate artificial limbs, determines its superior utility and beneficence. When the condyles of the femur are well provided with a long anterior or posterior flap, firmly united with corresponding short flaps, with or without the retention of the patella, the base of support which they present is far superior to any possibly to be gained in a thigh stump from the lateral walls and parts beneath the os ischium. The fitness of the articular surfaces, when clothed with a long anterior or posterior flap, or even with anterior and posterior flaps united and cicatrized over the face of the condyles, for such mechanical pressure as is experienced from the weight of the body, in the application of the artificial limb, must at once impress the anatomist and physiologist as natural and rational.

My experience in the treatment of many such cases, when contrasted with that in the treatment of a far greater number

of thigh amputations, affords me the strongest evidence of the vast superiority of the condyles of the femur over the walls of the thigh in benefits to the subject, whether for support or for locomotion.

The exhibition of two cases of disarticulation of the knee to the Board of U. S. Surgeons, commissioned to examine and approve artificial limbs and surgical apparatus, had the effect to conquer their preëstablished prejudice to that operation and to create a lively interest in its favor. With a well-adjusted thigh piece arranged to fit the condyles and fossa, and with trunnion bolts to attach the leg and compose an artificial knee-joint, without elongating the thigh beyond its fellow, the patient is very perfectly compensated in his loss. The retention of the entire thigh for leverage is thus secured, and is an inestimable advantage.

Of the different forms of flap the long anterior has, in a majority of cases, presented the best results. It affords a smooth surface to the base, where pressure is in excess, and to the anterior angle which is the point of application of the lever power for the propulsion of the leg forward in taking the step. The posterior angle, less subject to pressure and irritation, is the location suitable for the cicatrix.

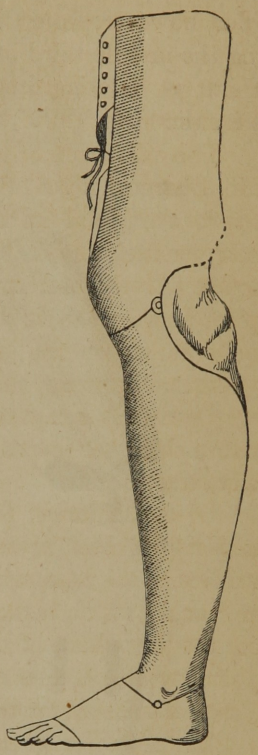
The retention of the patella, so long regarded as an essential and conservative feature in this operation, is of questionable expediency. When it maintains its natural position it affords a graceful contour and smooth surface to the stump, and an addition to the base of support. But in a majority of cases the patella retracts upon the anterior surface of the thigh. The extent of retraction varies from two to four inches; and I have noted, in one case, a retraction of six inches. (See cut, page 15.)

AMPUTATIONS OF THE LEG.

EXTREME UPPER THIRD.

Amputation for a knee support of the leg, near the head of the tibia, should always be the work of necessity, not of caprice; for the natural knee-joint, in the use of an artificial leg, should never be unnecessarily sacrificed: nevertheless, a leg

with a knee-bearing and artificial knee joint, is a highly satisfactory and useful dependence, both for utility and natural ness. When the knee-joint is perfectly anchylosed, or immovable, and the leg in a position at or near a right angle with the thigh, amputation should invariably be performed below the head of the tibia, if the condition of the knee will allow it to serve as a basis of support. Whenever disease or injury preclude the possibility of saving the knee without involving the condyles of the femur, then Hoin's mode of amputation, through the lower part of the condyles, as modified by Syme, will afford the patient a knee-support, in the application and use of an artificial leg, eminently superior in advantages to that of any amputation of the thigh higher up, where the support is mainly at its sides. (See Fergusson's *Practical Surgery.*) The accompanying cut represents the knee-supporting artificial leg.



THE UPPER THIRD,

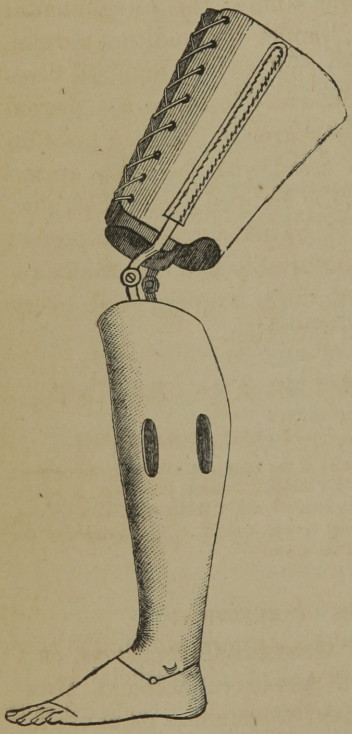
when the site *at or near its lower part* can be commanded, affords a very desirable and serviceable stump, which will admit of the adjustment and satisfactory use of an artificial leg, the same in quality as is adjusted to parts beneath. So great is the desire of all who suffer amputations of the leg to retain the use of the natural knee-joint with that of the artificial, as to frequently require an appliance, which is incompatible with the adverse length of the stump.

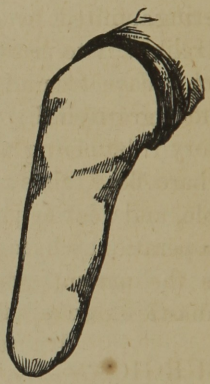
THE MIDDLE THIRD

affords a site for making a satisfactory stump, hardly second to the lower third in importance for the adaptation and use of an

artificial leg in every vocation, and for naturalness of gait. We differ, however, from the position of Mr. Fergusson, in preferring the middle third of the leg when the surgeon has a choice of site, as violating first principles. (Cut of artificial leg, same as for the lower third.)

AMPUTATIONS OF THE LEG AT THE LOWER THIRD.





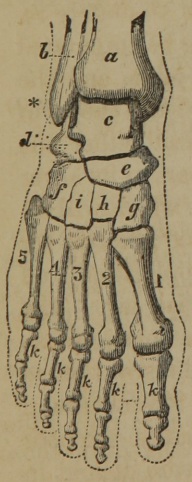
Whenever it is absolutely requisite that the leg be amputated above the ankle-joint, and the surgeon is allowed the choice of site, he should elect either the middle or upper part of its lower third, as the place which will afford the patient the greatest advantage by the application and use of an artificial leg. The practical benefits of a well-formed stump of that part, with a first-class artificial leg, are well established, and always prove gratifying to both the surgeon and patient; its "recompense of reward" is always immeasurably rich to both classes, the poor who are dependent upon their toil, and the rich who delight in appearing whole. The foregoing cuts represent a model stump of the leg, and the artificial leg for an amputation below the knee.

SYME'S OPERATION THROUGH THE ANKLE-JOINT.

SUCCESS OF SYME'S OPERATION.

There can be no mutilation *of the entire inferior extremity* that will in any degree compare with that of DISARTICULATION OF THE ANKLE-JOINT and its legitimate compensative apparatus, in beneficent results to the subject, and honor to surgery. The tibial articular termination of the stump, the integumental covering, united by granulations, render its condition normal, and reliable as a base of support. In nearly a hundred cases which I have treated, the result in every instance has proved proudly gratifying to all parties concerned. With a little initiatory treatment, the patient can tread with the naked stump the bare floor, the same as with the natural heel. The new, simple, and neat apparatus, which I have contrived to perfect this operation, when applied, so comfortably and effectually repairs the patient, for walking, running, leaping, and every gymnastic exercise, as to challenge detection.

SURGICAL ANATOMY OF THE ANKLE-JOINT.



BONES OF THE FOOT AND ANKLE-JOINT.

a and *b*, Inferior Extremity of the Tibia and Fibula; *c*, Astragalus; *d*, Os Calcis; *e*, Scaphoid; *f*, Cuboid; *g*, Internal Cuneiform; *h*, Middle Cuneiform; *i*, External Cuneiform; 1, 2, 3, 4, and 5, First, Second, Third, Fourth, and Fifth Metatarsal Bones; *k*, *k*, *k*, *k*, *k*, Phalanges of the Toes; *, Ginglymus joint of the ankle.

PLACES OF ELECTION.

The following "GENERAL CONCLUSIONS, OF A COMMITTEE OF THE ASSOCIATE MEDICAL MEMBERS OF THE SANITARY COMMISSION ON AMPUTATIONS OF THE FOOT AND ANKLE," are of the greatest importance to the subject for amputation, and worthy of all acceptation in practice by every surgeon in his devotion to the leading principles of surgery; to wit:

I. IN ALL AMPUTATIONS OF THE LOWER EXTREMITY, THE SURGEON SHOULD BE GOVERNED IN THE SELECTION OF THE POINT OF OPERATION AND THE METHOD TO BE ADOPTED—

1. By the Mortality of the operations in question.

2. By the Adaptability of the Stump to the most serviceable artificial limbs.

II. In all Injuries of the Foot, involving parts anterior to the Mediotarsal Articulation, the Surgeon should sacrifice as little as possible of the structures essential to progression. He should preserve

1. Single Phalanges, the importance of which increases from the small to the great toe.

2. The Metatarsus, by Amputation of the Phalanges, or by the Excision of individual Metatarsal Bones.

3. The Tarsus, by Amputation at the Tarso-Metatarsal Articulation (Hey's or Lisfranc's Method).

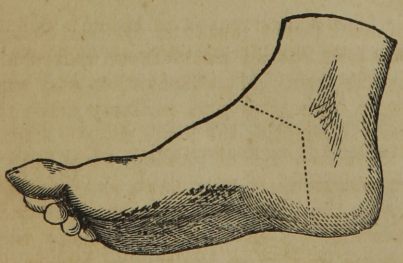
III. Of the Amputations through the Tarsus or at the Ankle-joint, preference should be given to Syme's Operation, as affording a minimum Mortality, with a Stump best adapted to an artificial limb. An artificial limb may be applied to a Syme's stump, which both relieves deformity, and renders the patient's gait free from the slightest halt.

IV. In the after-treatment of the amputations and resection above considered, it is good practice to leave the wounds open to heal by granulation.

STEPHEN SMITH, M. D., *Chairman.*
VALENTINE MOTT, M. D.
GURDON BUCK, M. D.
JOHN WATSON, M. D.
ALFRED C. POST, M. D.
WILLARD PARKER, M. D.
ERNEST KRACKOWIZER, M. D.
W. H. VAN BUREN, M. D.

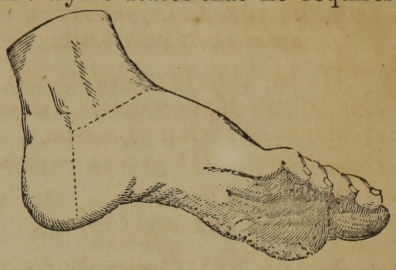
SYME'S LINE OF INCISION.

"The following wood-cuts, of reduced size, taken from similar illustrations in the *Monthly Journal*, February, 1850, of Mr. Syme's mode, give a more correct idea of the line of incision than can any verbal description. It will be seen that they differ very materially from those given in text-books.



"It is constantly alleged that this operation is difficult and tedious. We believe, however, that it may be executed with as much facility as the circu-

lar amputation of the leg. Mr. Syme states that he requires less time than a minute to perform it.



"*Accidents.*—The principal precaution to be observed is in the dissection on the posterior part of the os calcis, in order not to wound the posterior tibial artery, and thus deprive the flap of its nourishment."

Mr. Fergusson (see *Practical Surgery*,) says, and truly, that "so far as the subject of amputation is concerned, Mr. Syme's operation is one of the greatest improvements in modern surgery." This operation is perfected by beveling off the malleoli, which favors a perfect symmetry of the part constituting the ankle of the mechanical appliance. No appliance affords such useful and gratifying results as the new device for Syme's operation at the ankle-joint. The cut represents the stump of Syme's operation, which enables the subject to take his support on its end, the same as on the natural heel.

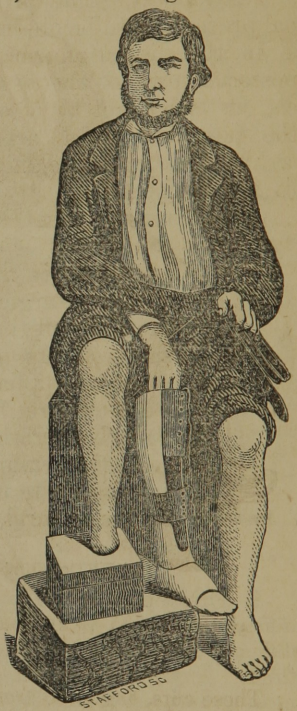
OBJECTION TO SYME'S OPERATION.

I. Difficulty.—The unworthy objection to this operation—its difficulty—should be entirely discarded. It is scarcely, if any, more difficult than other well-performed operations of either foot, leg, or thigh. Every surgeon should be fully prepared for the safest and most accomplished expedients. His operations upon the cadaver, his exact knowledge of parts, and requisite mathematical precision and care, should be his panoply; nor should he presume to undertake any first-class operation till he is competent to perform a Syme's in the most skillful and useful manner.

II. Mortality.—I know of no *a priori* reason in Medical Science why disarticulation of the ankle-joint should prove more unfavorable than Chopart's amputation of the foot. My observation and experience fully convince me that, in both civil and military cases, this plea is unfounded, and that, *cæteris paribus*, the same danger attends the one as the other. When there is a lack of vitality, when important tissues are involved, when gangrene is prevalent, or other unfavorable circumstances are present, the result will then be unfavorable in any case of extreme mutilation. I have attended many cases of Syme's, in all conditions; some in perfect health, and undergoing amputation for convenience; others low and debilitated; some suffering extensive necrosis of the tarsus and sloughing of the integuments of the heel and dorsal parts of the foot, leaving only lateral

tissues sufficient for the formation of flaps, and that by an unhealthy contiguity; of these I have not known one to result unfavorably.

I now regard it as an act of malfeasance, when the exceeding benefits to the patient are so demonstrated, when the surgeon has the choice of site, to neglect that at the ankle-joint, even though he may have to improvise flaps from the sides, or, the tissues of the heel being destroyed, from the dorsal parts of the foot. The results with appliance are incomparably better than those of any other amputation of the foot or leg. The modification of Syme's operation by M. Pirigoff is no improvement, neither does it possess one single advantage over Syme's. Waiving the danger from necrosis or a mere ligamentous union, in attempting to unite a fractional portion of the calcaneum, with its greatly reduced vitality, to the tibia—when this is successfully accomplished, what result has been attained? It furnishes no superior base of support to that of the articular surface of the tibia, well covered by the tissues of the heel, united by granulation or ligamentous tissue; the condition of the stump, thus elongated by the appended portion of the calcaneum, interposes a serious obstacle to the application of well-devised, legitimate apparatus; nor has it any advantage for the poor man who relies on the use of a boot.



CASES OF SYME'S OPERATION.

THE INTRODUCTION OF SYME'S OPERATION INTO AMERICA, AND ITS FIRST TREATMENT WITH SURGICAL APPARATUS.

LETTER.

DR. J. M. CARNOCHAN TO DR. J. SIMONS, U. S. A., PRESIDENT OF THE BOARD FOR THE EXAMINATION OF ARTIFICIAL LIMBS FOR SOLDIERS AND SAILORS, AND MEDICAL DIRECTOR U. S. A., RICHMOND, VA.:

14 East 16th St., N. Y., April 15th, 1865.

MY DEAR DOCTOR:

Dr. Hudson has just recalled to me a fact, which I very willingly confirm, that he is the first to have given attention to the mechanical means suited to meet the conditions of the lower limb, after amputation through the ankle-joint, known now as Syme's operation. Having been a pupil of Mr. Syme, on amore recent visit to Edinburgh, Syme was, at that time, engaged in introducing this operation, and soon after my return to this country, about 1852 or '3, I introduced the

SYME'S OPERATION WITH APPARATUS.

ankle-joint operation, I believe, for the first time here. Dr. Hudson, in 1854, adjusted one of his pieces of mechanism on one of my patients, much to my satisfaction. I make this statement wishing to render justice to Dr. Hudson, believing, as I do, that he merits much credit for the various ingenious improvements he has added to mechanical surgery.

Believe me, dear Doctor, very truly yours,

J. M. CARNOCHAN,
Professor Surgery, &c., &c.

To Dr. J. Simons,
U. S. A., &c.

These cuts, engraved from photographs,, represent the case of Kate Riley, described in the letter of Dr. Stephen Smith, page 29. The graceful appearance of the apparatus when dressed, and the fact of her having performed the duties of hospital nurse for many years, are the best of testimony to its ingenuity and utility:

APPEARANCE WHEN DRESSED.

II.—MORBUS COXARIUS (OR HIP DISEASE).

By the introduction of Dr. Davis' new method and appliances for the treatment of this hitherto formidable disease, we may rationally expect that its painful results will be essentially modified, if not entirely prevented.

At the present time, however, the number of those on whom the disease has wrought its baneful results, demands an appliance which shall alleviate their irremediable deformities and enable the sufferer to use and exercise the deformed limb in a manner likely to conduce to health, ease, and beauty of dress.

Some fifteen years ago I undertook, for the first time, the treatment of such a case, the applicant being a young lady, and with a success which has continued to the present time, a rich reward by its utility and improvement of her general health; since which time the apparatus has been so modified and improved as to be applicable alike to men and women, and proved gratifying to all to whom it has been adjusted. It is light, strong, and durable, and when applied, gives the patient the appearance, in dress, length of limb, and action of the feet, of being whole, and enables him to walk a great distance without fatigue.

Numerous cases have been presented for my advice and treatment. One young man of this city, whose limb was shortened six inches, who had been burdened with a heavy cork-boot, which, by its weight and dragging movement, greatly impaired his health and grace of action, says that no consideration would induce him to part with the artificial foot and its salutary effects. One young lady, with her limb shortened eight inches by congenital dislocation and lack of growth, now passes with her schoolmates as being apparently whole. There are many similar interesting cases to whom I am permitted to refer those who may desire such appliance, and to inform themselves of it by seeing its application and action.

The presence of the patient at the office is absolutely essential, for the commencement and accurate fitting of the parts.

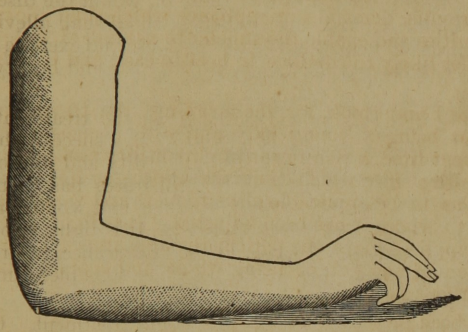
EXPLANATION OF CUT.

The deformed limb below the knee, is inserted in a light case, accurately fitted to the shape of the leg and ankle. It is retained by soft leather bands, laced in front.

The foot rests on an inclined plane so as to reduce the anterior-posterior distance from toe to heel. A calf-skin boot or gaiter, full at the instep, may then be drawn over the whole, and pants of the usual shape and size can be worn, and will entirely conceal the deformity. All parts are properly padded. The artificial foot corresponds in size with the foot of the other leg. The artificial ankle-joint obviates the excessive limping and physical strain experienced in the use of cork boots and stirrups. It also allows the patient to gain the natural length of step.

III.—ARTIFICIAL HANDS AND ARMS,

FOR AMPUTATIONS AND CONGENITAL DEFECTS.



The hand and arm are new and successful imitations of the natural ones; every joint and the contour, of the fingers, wrist, and elbow, being retained in their construction. They possess the functions of flexion and extension, for clasping and holding, and for every service which *intelligence* can expect in an artificial hand and arm. The many who have availed themselves of this beautiful and valuable device are well pleased with it, not only for its perfect imitation of the natural hand in dress, but for its efficient service, especially in an amputation of the forearm. Plaster Paris casts of the unamputated hand and arm, and of the stump, are essential for governing the size and symmetry in the construction of the artificial ones. A very beautiful and serviceable hand is made for congenitally defective hands and arms.

HONORARY TESTIMONIAL TO THEIR MERIT.

I have never presented these arms in competition for United States patronage. Their delicate mechanism, and artistic finish, render it impossible to furnish them at Government prices.

My desire to supply apparatus of first class workmanship and utility only, and my conviction of the secondary usefulness of even the best artificial arms, debarred me from the construction of an inferior article. Such, however, are made by others, and are of some practical utility. To the Board of United States Surgeons, convened in New York in 1864, in connection with other surgical apparatus presented for adoption by the Government, and for which I received commissions, I exhibited the artificial hand and arm as a scientific, ingenious, and artistic piece of mechanism, and to illustrate my interest in every department of mechanical surgery, and my ability to treat every form of mutilation in this as well as in its many other branches, with perfected apparatus. It was carefully studied and admired, and received honorary mention, in the report of the Board to the Surgeon-General, as being a work of art for lightness, grace of action, naturalness of dress and utility superior to all others.

IV.—APPARATUS FOR RESECTIONS

OF THE ARM, FOREARM, SHOULDER, AND ELBOW JOINTS.

The details of the examination and adoption of this apparatus by the Surgeon-General, U. S. A., and the practical results which it is intended to secure, may be found in brief on page 3 of this pamphlet. A more extended treatise on resections, and their treatment with apparatus, is contained in a Monograph—"Remarks on Exsections, with Cases and Plates, by E. D. Hudson, M.D., New York." The above monograph contains descriptions of ten selected cases of resections, including resections of the shoulder and elbow-joints, resection of the entire humerus and heads of the ulna and radius, resection of the upper, middle, and lower thirds of the humerus, and resection of the ulna and radius. I have in my journal numerous interesting cases recorded since the publication of the above, and additions are of daily occurrence, the benefit of which will be given to the profession from time to time.

These cases, viewed individually and collectively, throw much light on the many questions of expediency—the comparative success and utility of different modes of incision, the retention of a single articular surface, &c.—involved in the subject of resection, while the application of apparatus, of recent suggestion, demanding the retention of every power and function of nerve and muscle, so far as is possible, sets aside the modes of operating formerly employed, which, seeking no such end, mutilated both, looking only to the successful removal of bone, speedy healing, and the formation of a false joint or intervention of anchylosis.

The apparatus, or rather the system of apparatus—for each case demands an individual appliance, modified by the combination of site, mode and extent of operation, and the number of functions retained or impaired—is not intended to act upon the injured arm as a passive object alone, but to facilitate the use of every power and the exercise and ultimate restoration of lost vigor and impaired functions.

Where no vital nerves or important muscles have been severed, its usefulness is immeasurably augmented rather than obviated, as has been erroneously supposed. It retains the different parts at their natural distances from each other, supplies the place of the removed bone for leverage, holds the muscles within their proper limits, and augments their power by compressing them, as the pugilist bands his arm. A patient with resection at the elbow, when the insertions of the brachialis anticus, biceps, and triceps, have not been impaired, can pull forcibly and carry much weight in a vertical line, but with an apparatus he can in time raise heavy weights to the head, strike powerfully, and perform all that necessity requires with ease. Hence the superiority of its use to reliance on anchylosis or the formation of a false joint.

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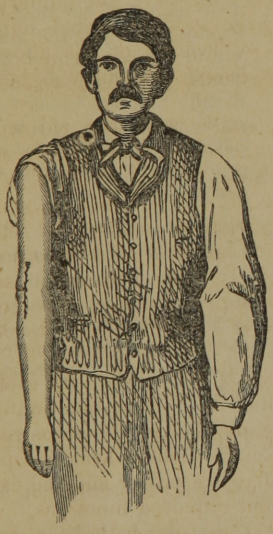
EXTRACT FROM "A TREATISE ON MILITARY SURGERY AND HYGIENE."

BY FRANK H. HAMILTON, M. D.,

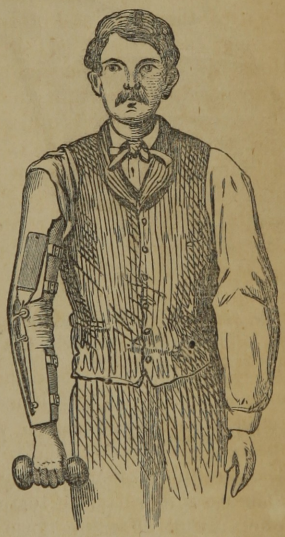
Surgeon to Bellevue Hospital, and Professor of Military Surgery.

DR. HUDSON'S APPARATUS FOR SUPPORTING THE ARM AFTER EXSECTION OF THE ELBOW JOINT.

"This ingenious apparatus, and which has recently been applied with great advantage to a case of our own, and also to a case in which Dr. Cutter, A. A. Surg. U. States Army, removed the entire humerus, is thus described by Dr. Hudson: 'An enveloping aponeurosis for the arm and forearm, to



EXSECTION OF THE ELBOW.



EXSECTION OF THE ELBOW TREATED.

prevent the displacement of muscles, extending from the shoulder to the elbow, and from thence to the wrist, united longitudinally by clasps, and supplied with a ginglymoid articulation at the elbow. Elastic rubber bands, attached to the apparatus by cords, and passing over the pulleys, assist the motions of flexion, extension, and rotation.'" P. 633.

RESECTION OF THE ENTIRE HUMERUS AND HEADS OF THE ULNA AND RADIUS.

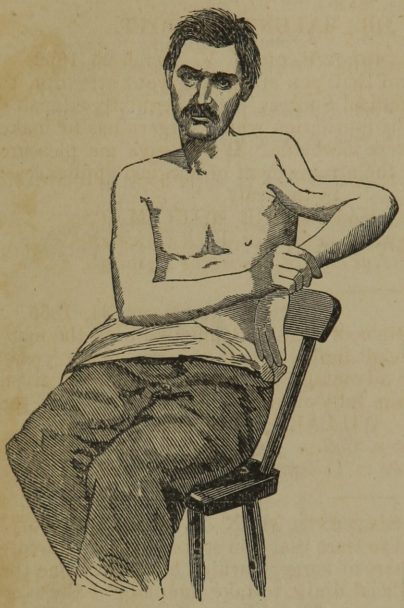
Condensed from Report on p. 9 of Dr. Hudson's Monograph.

J. E. F. Cleghorn, 1st New Jersey Cavalry, had the upper third of the humerus resected by Surgeon Clark U. S. A. Necrosis supervened.

Surgeon Cutter, U. S. V., removed the remaining portion of the humerus and the upper third of the ulna and radius. Operation successful. Powers of the carpal, metacarpal and digital muscles retained; some paræsis of the extensor carpi digitorum.

Eleven months after the first, and three months after the second operation, he presented himself for treatment.

Apparatus 1. Scapular piece, with artificial acromion process for a *point d'appui*. 2. Spiral humeral case of wood to band and fix the muscles. 3. Arthrodial shoulder joint. 4. Aponeurotic case for the forearm. 5. Pectoral and brachial adductors and flexors represented by elastic bands and tendons, &c., &c. Result: Can-flex forearm at right angle with arm, and hold parcels; can lift a pail of water perpendicularly, and pull strongly horizontally.



RESECTION OF THE UPPER THIRD OF THE HUMERUS. (From Photograph.) For Treatment see the Monograph.

PARTIAL RESECTION OF THE SHAFTS OF THE ARM AND FOREARM

are very numerous, as also those of the shoulder joint. Several are described in the monograph, and others will be published.

V.—APPARATUS FOR RESECTION OF THE TIBIA.

This apparatus is of recent application, and will be described at length, with other cases, in a separate pamphlet,

A case: Lieut. Orsamus R. Fyler, 2d. Conn. Heavy Artillery. Three inches of the tibia excised. New bone reproduced one and a half inches. Interspace one and a half inches. No atrophy.

Apparatus.—A case for the leg, lacing up in front; braces passing under the arch of the foot from lower end of the case; brace extending up to the thigh, and attached to a laced socket, &c., &c.

Result.—He is highly gratified, and walks without a cane, having the use of the knee and ankle-joint.

VI.—APPARATUS FOR UNUNITED FRACTURES

OF THE SUPERIOR AND INFERIOR EXTREMITIES.

Cases of the above have been treated for the Government and in civil practice with success.

EXPRESSIONS OF THE PROFESSION.

FROM THE LATE DR. VALENTINE MOTT.

No. 1 Gramercy Park, N. Y., March 26, 1862.

Dear Sir: I am gratified to find that you are giving your attention to what may properly be called Mechanical Surgery. As a regularly educated professional man you can repair the mutilation which surgery has to make much more effectually than the mere mechanic. It will give me pleasure to take advantage of your skill in the arrangement of surgical appliances.

Yours, truly,
VALENTINE MOTT, M. D.,
Emeritus Prof. of Surgery in the New York University, &c.;
Dr. Hudson. *Surgeon to Bellevue and St. Vincent's Hospitals, &c.*

New York, March 24, 1865.

E. D. Hudson, M. D., the successor of Messrs. Palmer & Co. in the manufacture and application of artificial limbs, I have known many years. Many of my patients have had the advantage of his skill, and he has given unfailing satisfaction. I believe him fully entitled to the confidence of the profession and the public.

WILLARD PARKER, M. D.,
Prof. Surgery, College Physicians and Surgeons,
Surgeon to Bellevue and New York Hospitals.

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14 East Sixteenth St., N. Y., March 27, 1865.

Dear Sir: I am much gratified to learn that you still continue to devote your attention to the mechanical part of surgery, which has for its aim the substitution and perfection of artificial limbs, to take the place of those on which disease has made the severe operation of removal necessary. Your education as a physician and surgeon enables you to carry out the indications which the peculiarities of individual cases must present, and thus the profession, and patients who have been so unfortunate as to have required amputation, will have the advantage of your mechanical ingenuity, as well as of your scientific acquirements.

The perfection to which the artificial limbs you are now engaged in manufacturing have been brought, and their recognized utility, place them among the valuable additions which intelligence and civilization have, in recent times, supplied for the amelioration and benefit of humanity. The professional community will undoubtedly avail themselves of your capabilities in your special vocation, as I shall assuredly do, when occasion requires.

Very truly yours,
J. M. CARNOCHAN, M. D.,
Dr. E. D. Hudson. *Prof. of Clin. Surg. N. Y. Med. Col.;*
Surg.-in-Chief to the State Emigrant Hospital, &c.

No. 121 Tenth St., N. Y., March 27, 1865.

The undersigned, from personal knowledge of Dr. E. D. Hudson's skill and success in the adaptation of artificial substitutes for amputated limbs, takes pleasure in recommending him to the patronage of the profession, and of all who stand in need of his services. The high esteem enjoyed by Dr. H. hitherto, in his professional relations, as well as his skill and experience acquired in the special department to which he devotes himself, entitle him to confidence and respect.

GURDON BUCK, M. D.,
Surg. to New York Hospital and St. Luke's Hospital.

NEW YORK, March 26, 1865.

My Dear Sir: I am gratified to know that you have formally adopted, as a specialty, the replacing of mutilated limbs, etc., by mechanical appliances. By bringing this duty to humanity properly within the pale of your profession, a step is gained in advance. It will give me pleasure to avail myself of your advice and assistance when occasion offers. Your entire uccess with the two cases of Syme's amputation at the ankle-joint was equally gratifying to my patients and to myself.

Most truly yours,

WILLIAM H. VAN BUREN, M. D.,

DR. E. D. HUDSON. *Surg. to New York Hospital, etc.;*
Prof. of Anatomy in New York University.

From personal knowledge of your success in supplying useful artificial limbs, I cordially indorse the sentiments of Dr. Van Buren.

JAMES R. WOOD, M. D.,
Surg. to Bellevue Hosp. and Prof. of Surgery, etc.

No. 4 EAST 17TH STREET, N. Y., Aug. 22, 1865.

I have now for many years employed Dr. E. D. Hudson's artificial limbs, and have had every reason to be well satisfied with their performance. In amputations at the knee and ankle-joint his appliances are admirable, and I know of no superior artificial limb to that which he adapts to stumps made in the continuity of the leg.

T. M. MARKOE, M. D.,
Surgeon to New York Hospital; Prof. Adj. College Physicians and Surgeons.

NEW YORK, August 21, 1865.

My Dear Sir: I take pleasure in adding to the many expressions of approval which you have already received from the profession. But I wish here to make particular mention of your specialty in the adaptation of an apparatus to supplant the clumsy shoe worn by patients who have suffered amputation at the ankle-joint, whether after the method of Syme or Pirigoff. From time to time I see the soldier on whom Pirigoff's operation was performed in the field, and who still wears your apparatus much to his satisfaction. The two cases of Syme's operation are also much gratified with their new feet, and walk without a halt.

I have also examined, with no little interest, your apparatus for the excision of the elbow-joint; I consider its introduction calculated to encourage surgeons in their efforts at conservative surgery of the upper extremities.

In conclusion, permit me to express my satisfaction at the interest and kindness you have manifested in the patients sent you from the Central Park U. S. Hospital, during the period of my administration of that institution. Hoping you will continue as untiring in your well-directed efforts in Mechanical Surgery, and wishing every success,

I am, sir, very respectfully,
Your obedient servant,
J. W. S. GOULEY, M. D.,
Demonstrator of Anatomy, University Medical College, N. Y., and Surgeon to Bellevue and St. Vincent's Hospitals, N. Y.

To E. D. HUDSON, M. D., Clinton Hall, N. Y.

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I have been long acquainted with Dr. Hudson, and have for many years recommended my patients to him for artificial limbs. While in charge of the U. S. General Hospital in Central Park, organized for the reception of soldiers requiring artificial limbs, my opportunities for judging of his skill were unusual.

I do not hesitate to recommend all of his work; but I desire to call especial attention to his very ingenious mechanism for the support of limbs on which resections have been practiced.

FRANK H. HAMILTON, M. D.,
Prof. Military Surgery Bellevue Hospital,
Medical College, New York.

64 Madison Avenue, N. Y., Aug. 22, 1865.

NEW YORK, August 25th, 1865.

Dr. E. D. HUDSON:

Dear Sir: It gives me great pleasure to certify to the practical utility of the artificial limbs which you have applied to patients under my observation. Your appliance to stumps in amputations at the ankle-joint, by Syme's method, has, in my experience, been the perfection of usefulness. In the case of Kate Riley nothing could have been more satisfactory, not only could she walk without embarrassment, but no imperfection in her gait was perceptible. She performed her duties as nurse in Bellevue Hospital for several years, running up and down stairs, walking great distances, without her peculiar disability becoming known, either to her associates or the Resident Medical Staff. While connected with the U. S. General Hospital at Central Park I had abundant opportunities to study the results of the application of artificial limbs, and the uniform satisfaction which your appliances gave, impressed me with their practical value.

Truly, yours, STEPHEN SMITH, M. D.,
Surgeon Bellevue Hospital; Prof. of
Principles Surgery Bellevue Hosp., Med. Col., etc.

FROM DR. R. S. SATTERLEE, BRIG.-GEN. U. S. A., MED. PURVEYOR, &c.

I have been for several years conversant with Dr. E. D. Hudson's efforts in the cause of conservative surgery, and have seen his appliances for the benefit of not only those who have suffered the loss of legs and arms, but especially his apparatus for operations at the ankle after the manner of Professor Syme, and in restoring action in resection of joints; and I think the Medical Profession, and the public, are under great obligation for his perseverance, and the degree of perfection to which he has brought his substitutes for nature in those cases. It gives me pleasure to make this statement.

R. S. SATTERLEE, M. D.,
Brig.-Gen. and Medical Purveyor U. S. A.

MEDICAL PURVEYOR'S OFFICE,
New York, Aug. 24th, 1865.

U. S. NAVAL HOSPITAL, N. Y.,
Brooklyn, Aug. 25th, 1865.

Dear Sir: I have been much gratified with the result of your treatment of the numerous cases of mutilation sent you from this hospital.

Your professional knowledge, with your mechanical skill, has enabled

you to furnish the most perfect relief to each particular case; and the results must have been exceedingly gratifying to the recipients.

I can, therefore, fully recommend you to all those who may have the misfortune to lose the use of their limbs by exsection or amputation, for the mitigation of their afflictions, as far as human means can.

Very respectfully,

Your obedient servant,

THOS. L. SMITH,

Surgeon U. S. N, in charge of Naval Hospital.

To E. D. HUDSON, M. D.,

Clinton Hall, Astor Place, New York.

NEW YORK, Aug. 24th, 1865.

DR. E. D. HUDSON,—*Dear Sir:* During two and a half years' service at U. S. A. General Hospital, Central Park, New York, I have very frequently examined the different mechanical appliances which you have furnished to the mutilated soldiers, and have been most favorably impressed with the skill, judgment, and care with which they have been arranged; but I would especially mention the excellency of your artificial foot for amputations at the ankle-joint, and your apparatus for resections of the elbow and shoulder-joints; also that for exsection in continuity of the humerus. I feel fully satisfied that by your ingenious mechanical treatment of resections of the upper extremities many limbs have been made exceedingly serviceable which otherwise would have remained comparatively useless, and that no artificial arms can perform the functions which these limbs do with the assistance of such apparatus.

Very respectfully yours,

S. TEATS,

Late A. A. Surgeon, U. S. A.

TESTIMONIALS OF PATIENTS.

Certificates are so readily obtained from patients for even the most inferior articles, and such gross deception has been practised in their use, that I am induced to give only a few as exponents of the general satisfaction afforded by my treatment and apparatus, and its great usefulness.

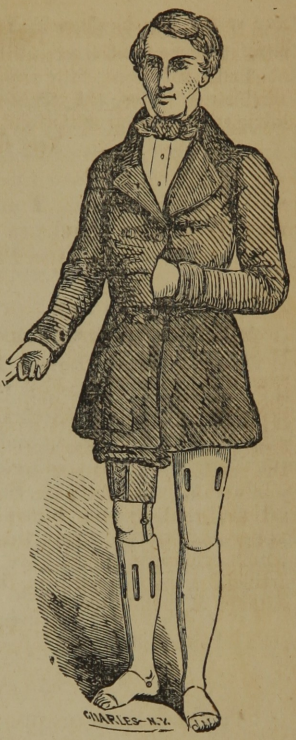
1. DOUBLE AMPUTATIONS.

From over fifty cases of double amputations, of both thighs, thigh and leg, knee-joint and leg, &c., the two following will suffice:

Case 1. Charles N. Lapham, Sergeant Co. K., 1st Vermont Cavalry, living at Bridport, Vt. Amputations, middle of thigh and knee-joint. Weight, 180 lbs. He says, after one month's use, "I can go up and down steps quite handy, much better than I expected

in so short a time. They give me no pain in wearing, and give perfect satisfaction every way."

Case 2. "J. S. Sanford, Esq.—*Dear Doctor:* On the 22d of August, 1851, I had the misfortune to get hurt in such a manner as to cause the amputation of both my legs necessary, one at the ankle and one at the thigh. I am to-day walking upon the pair of legs you then made and adapted for me. I am enabled to move about with comparative ease. I am now in the employ of the Central Railroad of New Jersey, at Pier No. 2, North River, and live fourteen miles from work. In going to and from work I have to go on ferry-boats and cars, which I do with perfect ease. Had it not been for you, I should have been a helpless cripple all of my days."



2. THIGH AMPUTATIONS.

The following are fair exponents of the general success attained in many hundreds of thigh amputations which I have treated:

Case 1. H. C. De Wolf, late Co. D. 7th Michigan Volunteers, from Camp Randall, Madison, Wis., says: "I am still a member of the Veteran Reserve Corps. * * * I frequently go from camp up to the city, a distance of two miles, do my business, and get back inside of an hour and a half."

Case 2. Horace T. Cook, attorney-at-law, Auburn, N. Y., says: "My weight is nearly one hundred and ninety pounds, and my stature six feet; and it is astonishing, even to me, with what ease, comfort, and rapidity I can walk, and also the distance, without fatigue. I now order a duplicate, which with the one I now have (a very good one) will last me as long as I shall, in all human probability, require such an *assistant* in walking."

3. KNEE BEARINGS AND DISARTICULATIONS OF THE KNEE.

The treatment of these cases is uniformly successful. I give first one of Dr. T. M. Markoe's patients (see letter, p. 28), with disarticulation of the knee; and second, the case of a lady, amputation at extreme upper third of leg; both wearing knee-bearing limbs.

Case 1. Martin Conroy says, New York, Aug. 28th, 1865: "I

have worn the limb, which you made for me nine years ago, continually since that time, at hard labor, and with perfect comfort and satisfaction."

Case 2. Sarah A. Thorne, Florence, Mass., says: * * "You counseled that the limb be amputated below the knee sufficiently for a knee support for an artificial leg. I submitted to the operation. * * I can walk two miles without a cane, and can work as I never anticipated I might again. I am truly happy in my new life, and owe many, very many thanks to you."

4. AMPUTATIONS OF THE LEG.

Of this—the most ordinary form of amputation—I have treated more than a thousand cases.

Case 1. Hon. Thomas H. Ward, formerly Colonel U. S. A., late U. S. Consul at Panama: "The legs which you made for me have given me great satisfaction, and although light (which is a great desideratum), are strong and durable, and have lasted without repairs much longer than any others which I have worn."

Case 2. Andrew J. Post, 110 Broadway, New York, surveyor and bridge builder: "For over eight years I have been engaged in heavy work in machine shops, and in civil engineering and surveying in the most difficult places and on every grade, with perfect reliability and naturalness. The ease and facility with which I walk surprises all my friends and acquaintances, and I would not part with my artificial limb for anything short of the original one."

5. SYME'S OPERATION.

See the letters on pp. 20, 21, 27, to 30, of Drs. Van Buren, Carnochan, Smith, Hamilton, Gouley, Teats, &c., which attest the successful treatment of their patients.

LADIES' TESTIMONIALS.

Case 1. Miss A. M. Dunbar, Friendship, N. Y.: "If you can make one walk so well with so short a stump (thigh amputation), you have no occasion to think of the word *fail;* and my heart tells me that your liberal discounts to the poor will not be unrewarded."

Case 2. Miss Maria Cox, New York: "The successful operation of my limb through many consecutive years is, I am fully convinced from the peculiarities of my case, mainly attributable to your professional knowledge, counsel, and encouragement. The limb is all I can desire."

TO LADIES.

Reference concerning the artificial limb, and advice, will be furnished to any lady desiring it.

Ladies, who apply for limbs, receive kind attention and courtesy, and also assistance in obtaining pleasant and inexpensive homes when they visit the city.